

PATENT ABSTRACTS OF JAPAN

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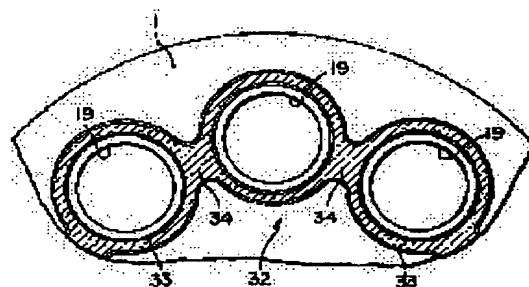
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(54) COMPRESSOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a compressor requiring a less number of part items, improving its assembling workability and achieving reduction in cost.

SOLUTION: The compressor comprises a plurality of cylinder bores arrayed in the peripheral direction of a cylinder block, pistons installed in the cylinder bore in a freely reciprocative manner for compressing a fluid, a cylinder head having a suction chamber and a discharge chamber inside, a valve plate provided between the cylinder head and the cylinder block to form a suction hole communicating the cylinder bores with the suction chamber and a discharge hole communicating the cylinder bores with the discharge chamber, a suction valve mounted between the cylinder block and the valve plate for opening/ closing the suction hole, and a discharge valve mounted between the cylinder head and the valve plate for opening/closing the discharge hole, wherein a sealing member is provided between the cylinder block and the valve plate for encircling the plurality of the cylinder bores at the same time.



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CLAIMS

[Claim(s)]

[Claim 1] The piston which is installed in the hoop direction of a cylinder block free [reciprocation in the cylinder bore by which two or more arrays were carried out, and each cylinder bore], and compresses a fluid, It is prepared between the cylinder head which has an inhalatorium and a regurgitation room inside, and this cylinder head and said cylinder block. The ports plate with which the discharge opening which opens for free passage the inhalation hole and cylinder bore which open a cylinder bore and an inhalatorium for free passage, and a regurgitation room is formed, In the compressor which has the suction valve portion which is infixed between said cylinder blocks and ports plates, and opens and closes an inhalation hole, and the discharge valve which are infixed between said cylinder heads and ports plates, and open and close a discharge opening The compressor characterized by preparing the seal member which surrounds the perimeter of two or more cylinder bores simultaneously between said cylinder blocks and ports plates.

[Claim 2] The compressor of claim 1 currently formed from the annular section in which said seal member surrounds the perimeter of a cylinder bore, and the connection section which connects the adjoining annular sections mutually.

[Claim 3] The compressor of claims 1 or 2 with which said seal member is prepared between the suction valve portion and the ports plate.

[Claim 4] The compressor according to claim 1 to 3 with which the slot where a seal member is inserted in said ports plate is formed.

[Claim 5] The compressor according to claim 1 to 4 with which said seal member consists of rubber.

[Claim 6] The compressor according to claim 1 to 5 said whose fluid is a carbon dioxide.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Field of the Invention] This invention is the optimal as a compressor of the refrigerant circuit which uses a carbon dioxide especially as a refrigerant about the compressor applied to the refrigerant circuit of for example, the air conditioner for cars etc.

[0002]

[Description of the Prior Art] From the former, the thing as shown in drawing 4 and drawing 5 is known as a compressor applied to the refrigerant circuit of the air conditioner for cars. In drawing, 51 shows the cylinder block of a compressor. Two or more cylinder bores 52 are formed in the hoop direction at the cylinder block 51. In the cylinder bore 52, the piston 53 is arranged free [reciprocation]. At the head of a cylinder block 51, the cylinder head 56 which has an inhalatorium 54 and the regurgitation room 55 is formed in the interior. The ports plate is formed between a cylinder block 51 and the cylinder head 56. The inhalation hole 58 and the discharge opening 59 are drilled by the ports plate 57. The suction valve portion 60 is formed in the inhalation hole 58, and the discharge valve 61 is formed in the discharge opening 59. The opening of a discharge valve 61 is regulated by the retainer 65.

[0003] The wall 62 is established in the cylinder head 56, and it is divided with this wall 62 at the inhalatorium 54 and the regurgitation room 55. And the cylinder bore 52 is opened for free passage with the regurgitation room 55 through the inhalatorium 54 and the discharge opening 59 through the inhalation hole 58, respectively.

[0004] In the above compressors, a piston 53 reciprocates the inside of a cylinder bore 52, the fluid (for example, carbon dioxide as a refrigerant) inhaled from the inhalation hole 58 is compressed, and a compression fluid is breathed out from a discharge opening 59. Thus, inhalation, compression, and the regurgitation are continuously repeated within a cylinder bore 52.

[0005] Therefore, when a fluid begins to leak from a cylinder bore 52 in each process of inhalation, compression, and the regurgitation, there is a possibility that nonconformities, such as lowering of regurgitation capacity and generating of pulsation, may arise. For this reason, the annular seal member 63 surrounding the perimeter of a cylinder bore 52 is formed between a cylinder block 51 and a ports plate 57, and the leakage of a fluid is prevented. Moreover, a gasket 64 is formed in the rim side of a cylinder block 51, and runoff of the fluid from between the adjoining cylinder bores 52 to the direction of a path of a cylinder block 51 is prevented (for example, JP,11-343974,A).

[0006]

[Problem(s) to be Solved by the Invention] However, in the above compressors, since it is necessary to form the respectively annular seal member 63 in the perimeter of each cylinder bore 52, components mark increase. For this reason, there is a possibility of causing lowering of attachment workability and lifting of a manufacturing cost. In addition, although the case where a carbon dioxide is used as a refrigerant is increasing by the request of the formation of dechlorofluocarbon in recent years, it is so-called CO₂. Since line pressure becomes high compared with the former in a cycle, improvement in the further seal nature is desired.

[0007] The technical problem of this invention is to offer the compressor excellent in attachment workability by low cost while it improves the seal nature around a cylinder bore and prevents generating of pulsation etc.

[0008]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the compressor of this invention The piston which is installed in the hoop direction of a cylinder block free [reciprocation in the cylinder bore by which two or more arrays were carried out, and each cylinder bore], and compresses a fluid, It is prepared between the cylinder head which has an inhalatorium and a regurgitation room inside, and this cylinder head and said cylinder block. The ports plate with which the discharge opening which opens for free passage the inhalation hole and cylinder bore which open a cylinder bore and an inhalatorium for free passage, and a regurgitation room is formed, In the compressor which has the suction valve portion which is infixed between said cylinder blocks and ports plates, and opens and closes an inhalation hole, and the discharge valve which are infixed between said cylinder heads and ports plates, and open and close a discharge opening It is characterized by preparing the seal member which surrounds the perimeter of two or more cylinder bores simultaneously between said cylinder blocks and ports plates.

[0009] The above-mentioned seal member can be formed from the annular section surrounding the perimeter of a cylinder bore, and the connection section which connects the adjoining annular sections mutually. Moreover, metals, i.e., a cylinder block, and a ports plate can reduce the field which contacts directly by preparing the above-mentioned connection section. Therefore, since the inconvenience by which a fluid leaks from between adjoining cylinder bores to the exterior of a compressor can be prevented, it also becomes possible to abolish the gasket by the side of the rim which was the need conventionally.

[0010] Moreover, the above-mentioned seal member can be prepared between a suction valve portion and a ports plate. In this case, as for a seal member, it is desirable to be inserted in the slot formed on the ports plate. Moreover, the above-mentioned seal member can also be prepared between a cylinder block and a suction valve portion. In this case, what is necessary is just to form the slot where a seal member is inserted in a cylinder block.

[0011] Moreover, although especially the construction material of the above-mentioned seal member is not limited, it is desirable that they are rubber, resin, etc., for example.

[0012] Although this invention is widely applicable to the compressor which compresses a fluid, it is the optimal as a compressor of a refrigerant circuit which uses a carbon dioxide as a refrigerant especially.

[0013] In the above compressors, the seal member which surrounds the perimeter of two or more cylinder bores simultaneously is infixed between the cylinder block and the ports plate. That is, it becomes possible to surround the perimeter of two or more cylinder bores by one seal member. For this reason, compared with the conventional compressor with the need of arranging a respectively separate seal member in the perimeter of each cylinder bore, components mark can be reduced substantially. Moreover, the attachment workability of a seal member can be improved and a cost cut can be attained. Furthermore, if it forms from the connection section which connects the annular sections which adjoin the annular section surrounding the perimeter of a cylinder bore in a seal member, since the leakage of the fluid from the clearance between the annular sections to the direction of a path of a cylinder block can also be further prevented by the connection section, preventing the leakage of the fluid from a cylinder bore certainly by the annular section, a gasket with the need of installing in the rim side of a cylinder block conventionally is omissible.

[0014]

[Embodiment of the Invention] Below, the desirable example of the compressor concerning this invention is explained with reference to a drawing. Drawing 1 thru/or drawing 3 R> 3 show the compressor concerning one example of this invention. In drawing, 1 shows housing (cylinder block). The ends of housing 1 are blockaded by the front housing 2 and the cylinder head 3, and the crank case 4 is formed in the interior. The ports plate 30 is formed between housing 1 and the cylinder head 3. A gasket 36 is infixed between a ports plate 30 and a cylinder block 1, and

the gasket 37 is infixed between a ports plate and the cylinder head 3. The cam plate 5 is arranged inside the crank case 4. The driving shaft 6 is inserted in the center section of the cam plate 5. The driving shaft 6 is supported by the bearing 7 free [a revolution].

[0015] On the whole surface of a cam plate 5, the handle part 9 prolonged toward Rota 8 is formed. The slot 10 is drilled by the handle part 9. The pin member 11 is inserted in a slot 10, and also when the tilt angle of a cam plate 5 changes, a cam plate 5 and Rota 8 are connected substantially. Moreover, thrust support is carried out through thrust bearing 12 at the wall of the front housing 2, and Rota 8 is rotated in one with a driving shaft 6.

[0016] The splash plate 13 is formed in the cam plate 5 through thrust bearing 14. The revolution of a cam plate 5 is enabled by thrust bearing 14 to the splash plate 13.

[0017] The spherical-surface seat 15 is formed in the periphery section of the splash plate 13. Pivot 17a of the end of a piston rod 16 is connected to this spherical-surface seat 15. On the other hand, the piston 18 is joined to pivot 17b of the other end of a piston rod 16. Two or more pistons are connected to the splash plate 13 like the above in the compressor hoop direction, and it is arranged free [reciprocation in each corresponding cylinder bore 19].

[0018] Moreover, near the periphery of the splash plate 13, the revolution inhibition device 20 which inhibits a revolution of this splash plate 13 is established.

[0019] The clutch section 21 is formed in the edge of the front housing 2. And the driving force transmitted to a driving shaft 6 was transmitted by turning on and off of the clutch section 21, or was intercepted, and is come by it.

[0020] The interior of the cylinder head 3 is formed by the inhalatorium 23 and the regurgitation room 24 with the wall 22. Moreover, the inhalation hole 25 and discharge opening 27 corresponding to each cylinder bore 19 are drilled by the ports plate 30. And the inhalatorium 23 is opened for free passage in each cylinder bore 19 through the inhalation hole 25 which has a suction valve portion 26. Moreover, the regurgitation room 24 is opened for free passage in each cylinder bore 19 through the discharge opening 27 which has a discharge valve 28.

[0021] The retainer 31 is formed in the regurgitation room 24. An opening is regulated when a discharge valve 28 contacts the field which contacts the discharge valve of a retainer 31.

[0022] Between the suction valve portion 26 and the ports plate 30, the seal member 32 which consists of rubber is more specifically infixed between the cylinder block 1 and the ports plate 30. The seal member 32 is formed from the annular section 33 surrounding the perimeter of a cylinder bore 19, and the connection section 34 which connects the adjoining annular section 33 mutually. The annular section 33 is formed in the hoop direction of a cylinder block 1 corresponding to the number of the cylinder bores 19 prepared. [two or more] That is, in this embodiment, one seal member 32 is only arranged in a position, and it is surrounded by the annular section 33 to which the perimeter of two or more cylinder bores 19 of all corresponds. In addition, in this embodiment, the seal member 32 is inserted in the slot 35 established in the ports plate 30.

[0023] In the compressor of this embodiment, if the revolution driving force from driving sources (graphic display abbreviation), such as a drive motor and an automobile engine, is transmitted to a driving shaft 6, for example, this revolution driving force will be transmitted to a cam plate 5 through Rota 8, and a cam plate 5 will rotate it in the condition of having inclined at the predetermined include angle. The cam plate 5 is formed in the splash plate 13 free [a revolution], and it is rocked with a revolution of the cam plate 5 which this splash plate 13 rotates after the splash plate 13 has inclined, since the revolution was inhibited by the revolution inhibition device 20. And the piston 18 connected to the splash plate 13 reciprocates the inside of a cylinder bore 19. The fluid (it sets in this embodiment and is a carbon dioxide) inhaled from the inhalation hole 25 is compressed by reciprocation of the piston 18 in each cylinder bore 19, and a compression fluid is breathed out from a discharge opening 27.

[0024] Moreover, in the compressor of this embodiment, the seal member 32 which surrounds simultaneously the perimeter of two or more cylinder bores 19 is infixed between the suction valve portion 26 and the ports plate 30. That is, it becomes possible to surround the perimeter of two or more cylinder bores 19 by one seal member 32. For this reason, compared with the conventional compressor which suited the need of arranging a respectively separate seal

member in the perimeter of each cylinder bore, components mark can be reduced substantially. Therefore, the attachment workability of the seal member 32 can be improved and a cost cut can be attained.

[0025] Moreover, it can also prevent simultaneously the leakage of the fluid from the clearance between annular section 33 comrades to the direction of a path of a cylinder block 1 by the connection section 34 further, preventing certainly the leakage of the fluid from a cylinder bore 19 by the annular section 32, since the seal member 32 is formed from the annular section 33 surrounding the perimeter of a cylinder bore 19, and the connection section 34 which connects annular section 33 adjoining comrades. Therefore, the gasket 36 currently installed in the rim side of a cylinder block 1 can also be omitted.

[0026]

[Effect of the Invention] Attachment workability can be improved while only the number of cylinder bores reduces components mark substantially compared with the conventional compressor for which the sealant was required, since the seal member which surrounds the perimeter of two or more cylinder bores simultaneously is prepared between the cylinder block and the ports plate when being based on the compressor of this invention, as explained above.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view of the compressor concerning one example of this invention.

[Drawing 2] It is the sectional view which meets the II-II line of the compressor of drawing 1 .

[Drawing 3] It is the partial expanded sectional view of the compressor of drawing 1 .

[Drawing 4] It is the partial expanded sectional view of the conventional compressor.

[Drawing 5] It is the sectional view which meets the V-V line of the compressor of drawing 4 .

[Description of Notations]

1 Housing (Cylinder Block)

2 Front Housing

3 Cylinder Head

4 Crank Case

5 Cam Plate

6 Driving Shaft

7 Bearing

8 Rota

9 Handle Part

10 Slot

11 Pin Member

12 14 Thrust bearing

13 Splash Plate

15 Spherical-Surface Seat

16 Piston Rod

17a, 17b Pivot

18 Piston

19 Cylinder Bore

20 Revolution Inhibition Device

21 Clutch Section

22 Wall

23 Inhalatorium

24 Regurgitation Room

25 Inhalation Hole

26 Suction Valve Portion

27 Discharge Opening

28 Discharge Valve

30 Ports Plate

31 Retainer

32 Seal Member

33 Annular Section

34 Connection Section

35 Slot

36 37 Gasket

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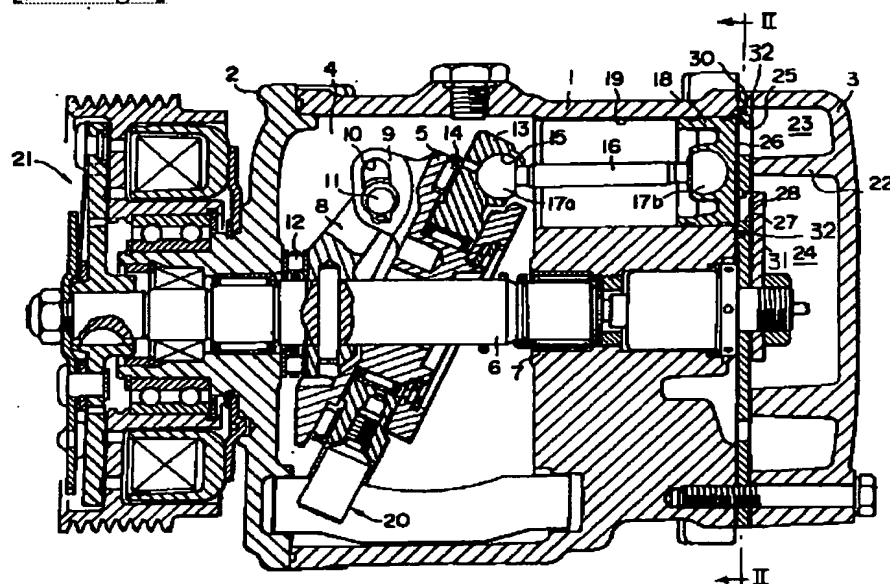
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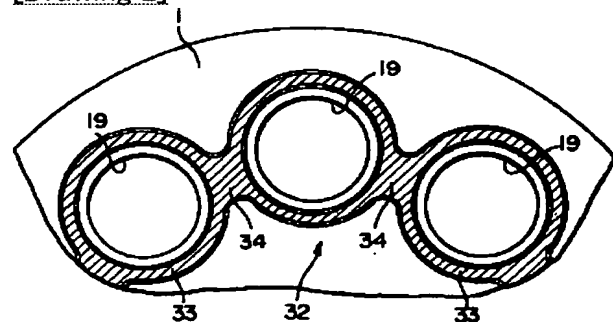
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DRAWINGS

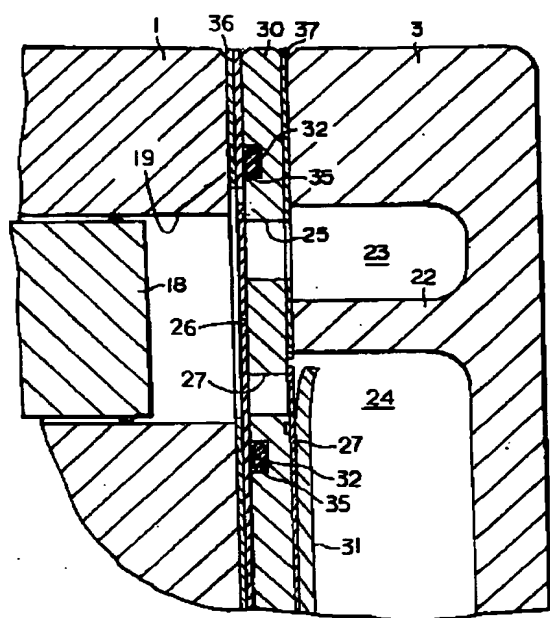
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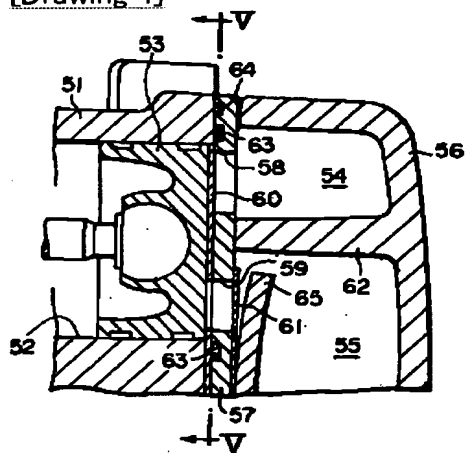
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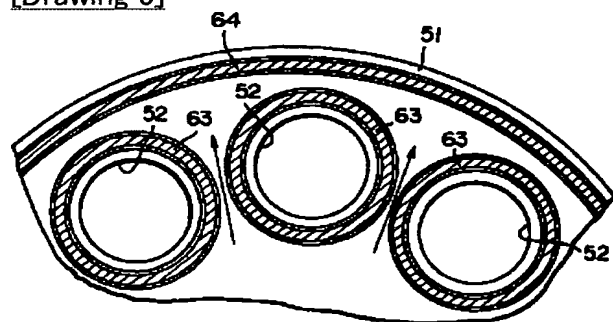
[Drawing 3]



[Drawing 4]



[Drawing 5]



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